

Paleo-tsunamis in South-Central Chile: evidence from coastal lakes

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Recent megathrust earthquakes such as the Great Sumatra-Andaman Earthquake (M_w : 9.3) 26.12.2004 in Indonesia, also remembered as the Boxing Day Tsunami, the Maule Earthquake (M_w : 8.8) 27.02.2010 in Chile and the Tohoku Earthquake (M_w : 9.0) 11.03.2011 in Japan, have shockingly illustrated how little is still known about megathrust earthquakes and their associated tsunami hazards. After the large number of victims and the vast damages to infrastructure the probabilistic risk evaluation of these hazards needs to be reconsidered. This reconsideration needs to include more detailed studies on recent tsunamis and tsunamis from the historic and pre-historic record in order to avoid redundancy. Coastal lakes have the potential of recording and preserving tsunami inundations within their sediments.

In winter 2011/2012 a field survey was conducted on Lake Cucao and Lake Huelde on Isla de Chiloé. High resolution 2D-seismics data and composite piston- and gravity cores were collected. Based on preliminary results of the analyses of the acoustic data and the sediment the tsunami history is discussed. The background sedimentation of both lakes is gyttja with preserved leaves and twigs, which allows good age control. Decimetre-scale, detrital layers are ascribed to tsunami inundation into the lakes. The tsunami deposits are correlated with the paleoseismologic record of the region. By comparing the pre-historic tsunami deposits to the more recent events conclusions can be drawn about the size of paleo-tsunamis. The inundation behaviour of the tsunami is analysed by interpreting lateral changes of single tsunami layers through the lakes. The record of large megathrust earthquakes on the Chilean coast is thus complemented and (hopefully) extended further back in time. This increases the statistical meaning of tsunami hazard risk analyses.